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Status of Claims

In view of the newly cited art, claim 28 has been amended for clarification. The substance of the invention has not changed. It is requested that should the Examiner not find this claim allowable, that the amendments be entered for the purpose of further prosecution. This request is believed to be reasonable in light of the fact that this has been applicant's first opportunity to distinguish over the new reference.

Amended claim 28, and dependent claims 29-34, are submitted for consideration. Since the amendments simply clarify the invention previously claimed it is believed that no new substantive issues have been raised. This may be further evident from the discussion below.

The Drawing

The objection to the drawing that was made in the previous Office action has evidently been overcome by the amendment presented in the last response. While not specifically indicated it would appear that the drawing is now acceptable.

Rejections On Prior Art

With the citation and reliance on a new reference, there are now two basic issues involved.

Kinoshita patent

The new reference, the Kinoshita patent, is directed to an integrated resistor that comprises both a semiconductor resistor element, and a polysilicon resistor element. The two contribute to reducing the resistivity variations of the resistor with temperature. There is no field plate disclosed in the Kinoshita patent. Therefore the reference fails in a fundamental respect to provide any of the teachings in applicant's disclosure.

As was discussed earlier in this prosecution, the complexity of the structure claimed and the very large body of silicon semiconductor prior art, makes likely the possibility that structures that have nothing to do with the spirit of the invention may accidentally read on certain claims. Therefore it is often necessary to wordsmith the claims to avoid that accidental reading. That has been done in the present case. To be effective, the field plate should overlie substantially the resistor body. That is the whole point of the field plate. Applicant's claims have been amended slightly to ensure this condition. The condition is clearly taught in the drawings and is at the heart of the disclosure. The basic operation of a field plate does not raise a new issue. It has been at the center of this prosecution all the time.

The reference does not have a field plate. The effective resistor body lies between the two contacts to the resistor. It is this body that requires shielding. There is no polysilicon plate overlying the resistor body.

Kondo patent

The Kondo patent was discussed at length in applicants' last response. The feature that one of the resistor body contacts lies beneath the field plate, thus saving space on the semiconductor IC, was argued in detail. Evidently the Examiner appreciates that the Kondo patent lacks this feature, and cites the Masahiro patent as showing such a contact arrangement. But the combination of the Kondo patent and the Masahiro patent is fundamentally defective. There is no field plate described in the Masahiro patent. The polysilicon plate in the Masahiro patent is part of the resistor. How or why one would combine the teachings of these two references is not evident, nor is it described in the Office action. If the resistor structure of the Masahiro patent is added to the structure of the Kondo patent, an additional polysilicon layer would be included between the substrate resistor 2, and the polysilicon shield 7. That does not address the placement of the resistor contacts, namely that one of the resistor contacts is placed beneath the polysilicon shield. It would appear to further complicate, and make less likely, that possibility.

As described before, there is no resistor contact beneath the field plate in the Kondo patent. An examination of the Kondo patent reveals that the insulating layer that separates the field plate and the resistor body has no window beneath the field plate. The field plate in Figs. 8 and 9 is element 39-1. There is no window in the insulating layer beneath element 39-1, and there is no portion of element 39-1 that extends through a window to the resistor body 35. Since there are no contacts underneath the field plate, all contacts to the substrate resistor

body must lie outside the area of the polysilicon field plate, thus – in comparison with the arrangement of the invention – consuming unnecessary chip area.

At this point it should be evident that the invention, i.e. the problem and solution, are not mentioned or in any way anticipated by the Kondo patent.

The dependent claims, claims 29-34, rely largely on the features of claim 28 for patentability.

In view of the amendments and these remarks, reconsideration and allowance of claims 28-34 is requested.

In the event that the Examiner concludes that a telephone call would advance the prosecution of this application, the Examiner is invited and encouraged to call the undersigned attorney at Area Code 757-258-9018.

Respectfully,



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MARKED-UP CLAIM 28

28. An integrated circuit having a field-plated resistor the field-plated resistor comprising:

a resistor body formed in a semiconductor substrate, the resistor body having first and second contact regions,

a first insulating layer on the resistor body, the first insulating layer having a top surface and a bottom surface, with the bottom surface in contact with the resistor body, and approximately coextensive therewith,

a contact window in the first insulating layer and extending from the top surface of the first insulating layer through the first insulating layer to the resistor body,

a field plate on the first insulating layer and approximately coextensive therewith and with the resistor body, the field plate having a top surface and a bottom surface, with a portion of the bottom surface extending through the contact window in the first insulating layer and into contact with the first contact region of the resistor,

a second insulating layer, with a first portion of the second insulating layer at least substantially covering the field plate,

an electrical contact to the top surface of the field plate,

an electrical contact to the second contact region of the resistor, and

a plurality of metal conductors formed on the first portion of the second insulating layer.